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ABSTRACT

A study examined the effectiveness of university supervisors' feedback on the Academic Learning Time in Physical Education (ALT-PE) of students in two student teachers' classes. Subjects used in this study were secondary school pupils (chosen at random) in two student teachers' physical education classes. Students were observed 13 times for a 40 minute period by two observers trained in the ALT-PE interval system. The student observations, which occurred during the teaching of volleyball skills, were conducted during baseline and intervention periods. Results indicate that a behavior change did occur in both student teachers' pupils as a result of the intervention, which was supervisory feedback. ALT-PE was found to be a valuable supervisory tool in helping student teachers improve instructional performance and in helping student teachers increase their pupils' achievement. Tables displaying study data and references are included. (JM)

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The Effect of Feedback On Academic Learning Time (PE Motor) In Student Teachers' Classes

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It has only been within the last decade that the area of pedagogy in physical education has become a major discipline within the profession, and only since this time have we begun to ascertain what is really taking place in physical education at the various levels within our schools. Prior to this pedagogical reformation many of our attempts in the training of preservice teachers, graduate courses for teachers, and workshops/clinics on advanced techniques were based on two items: 1) what worked for the instructor when he/she was teaching; and 2) the use of techniques by teachers that would keep students in order during physical education class. There was no evidence of what students were learning or if learning was actually taking place. Also there was no data on what teacher behaviors effected student performance, and, of course, no data on how students were spending their time during physical education class. The door was opened when educational researchers began to do process-product research. Experimenters finally began to investigate the effect of teacher behavior and classroom practices on student achievement. Physical education researchers like Siedentop (1976) began to focus in on what students were actually doing during physical education class. They also began to assess teacher behavior during class, and its subsequent effect on students. Still, measurement of student achievement in physical education proved difficult. The Beginning Teacher Evaluation Studies (BTES) conducted by the Far West Laboratory for Educational Research and Development shed some light on our problem of measuring student achievement in physical education. The BTES study (Marliave et al. 1972) measured student learning through the variable of academic learning time. Academic Learning Time (ALT) was defined as the "amount of time a student spends engaged in an academic task that the student can perform with high success." The more ALT a student accumulates, the more a student learns. ALT can be utilized to examine the correlation between what teachers do and the amount of time students spend on specific tasks. From the BTES study, Academic

Learning Time in Physical Education (ALT-PE) came about. ALT-PE rests on the premise that the longer a student is engaged in the subject matter, the more student achievement will accrue. ALT-PE and its observation coding system was developed by Siedentop, Birdwell, and Metzler (1979) and now allows systematic observation in the study of teacher effectiveness and student participation/achievement in physical education. Metzler (1979) has given us the much needed descriptive data in physical education using the ALT-PE observation system. He has given us the data as to what students are doing and achieving in physical education classes at the elementary, junior high, secondary, and college levels. He has also given us some norms as to the different amounts of Academic Learning Time P.E. Motor (ALT-PE(M) that we can expect in the various individual and team sports at the various levels within our school programs. This data is invaluable in helping us to prepare teachers, supervise student teachers, and provide meaningful clinics/workshops for practitioners already in the field. Recently ALT has been used as a dependent variable in which the investigators were attemtping to change teacher behavior and assess this change on ALT or ALT-PE(M) (Metzler 1981, Birdwell 1980, Whaley 1980). ALT-PE has also helped us to assess the success of mainstreaming in physical education and the difference between the mainstreamed child and the "regular" child as to their achievement in physical education. (Aufderheide, Olson and Templin 1981, Shute et al. 1982). Also included in the Shute et al. study (1982) was some descriptive data on ALT in movement education classes at the elementary level, and the differences between boys and girls' ALT movement patterns in elementary physical education.

Academic Learning Time, as mentioned in the earlier paragraph, can be a valuable assessment technique in the supervision of student teachers. ALT-PE can be a valuable tool in helping supervisors assess improvements in student

teachers, providing supervisors with a set of behaviors for student teachers in which goals can be targeted for improvement, and providing information to the student teacher as to what is actually taking place in his/her classes. Mosher and Purpel (1972) state that supervisors have little effect on the improvement of student teachers during the student teaching experience. The ALT-PE coding system can help supervisors effect change in student teachers' instructional behaviors, class organization, and student achievement. ALT-PE(M) would be a dependent variable that could be used to demonstrate the change. Metzler (1981) was the first to attempt an experimental study in which ALT-PE(M) was used as the dependent variable as a measure of targeted students change in the classes of a student teacher. There is a need to do more experimental studies using ALT-PE(M) as a measure of behavior change for experienced teachers and student teachers. There is also a need to train university supervisors to use the ALT coding system in an attempt to change student teacher behavior/performance, and to assess if supervisors do make a difference. The major weakness in ALT experimental research has been to see if changes in the targeted students observed in the classes of student teachers or regular teachers was maintained after the intervention procedure was removed. The purpose of this study was as follows:

1. to examine the effectiveness of university supervisors' feedback on the ALT-PE(M) of targeted students in a student teacher's class.
2. to examine the effect of changes made by the student teacher in his/her classes on the ALT-PE(M) on selected students in physical education class.
3. to determine whether the effects of the intervention were maintained after intervention was removed.

Subjects and Settings

The subjects used in this study were targeted secondary students in physical education classes of two student teachers. The targeted students in both classes were chosen at random. Both student teachers were males involved in coed volleyball units in their respective schools. Both student teachers received full control of their classes after two weeks. Student teacher number one's class had thirty-two students on the class roster and student teacher number two's class had thirty students enrolled. Each class was involved in a seven week volleyball unit, but it was decided not to start collecting data until the student teacher got his class into game play. Since the student teachers did not take over their classes until the third week and since one more week was to be spent on skill practice, it was decided not to collect data until the fourth week began with game play. This followed the suggestions made by Metzler (1981) not to collect data and implement interventions in units where baseline involved drill situations and intervention was mainly during game situations Metzler (1981) suggests "that the change in class planning will produce differences in ALT-PE obviously not attributable to the intervention," that is why baseline and intervention were done during the game play of the unit only.

Observations

Observation of target students in each student teacher's class was made with the ALT-PE interval recording system (Metzler 1979). Observations were made by two observers trained to use the ALT-PE interval system. Each observation lasted approximately forty minutes. Both targeted classes and students were observed thirteen times. Student teacher number one's targeted students were observed four times during baseline, and seven times during intervention, with two post checks. Student teacher number two's targeted students were observed six times during baseline, and five times during intervention, with two post checks.

Reliability

Each observer as mentioned earlier went through an extensive training period before data collection began. Two reliability checks both unannounced were made on each observer during both baseline and intervention phases. The Scored Interval Method (SI) (Hawkins and Dotson 1973) was used to compute inter-observer agreement. Reliability was computed for each of the four major ALT-PE categories (setting, content, learner move, and difficulty level) and for the total number of observation intervals recorded. Table 1 indicates that reliability was acceptable for data collection using the ALT-PE interval recording system.

Table 1 goes about here

Midway through data collection both observers were brought back in for an extra training session and reliability check, (via videotape). This was done to prevent against observer drift during the study, and to go over any special problems observers were having in their data collection.

Methods and Procedures

Target Behavior and Baseline

The dependent variable used in this study was the percent of ALT-PE(M) in the student teachers targeted class and subjects. ALT-PE(M) is defined as any interval in which the target student is involved in a motor task at an easy level of difficulty (Metzler 1979). "Since physical education is mainly involved in physical activity and the learning of skills, ALT-PE(M) is a better measure of student opportunity to learn a skill than general ALT-PE". (Metzler 1981). During the baseline phase three important coding categories were calculated, content physical education, engaged motor, and ALT-PE(M). The percentage in these three categories even though collected on target students, was grouped by class and presented as a mean percentage of intervals in Table 2

Table 2 goes about here

During baseline only seventeen percent of all intervals in student teacher number one's class and twenty percent of all intervals in student teacher number two's class were coded as engaged motor. Both student teachers' classes had only seven point five percent of the observed intervals coded as ALT-PE(M). During baseline, categories such as not engaged interim (changing sides of the court, waiting for the ball to be put back into play) not engaged waiting (waiting on the side to get into the games as a substitute) and not engaged off task were the categories coded most frequently in the learner move category.

Intervention

As demonstrated in baseline there were very low percentages for both engaged motor and ALT-PE(M) in both of the student teachers' targeted students and classes. It was decided by the investigator to use the data collected to try and help the student teachers improve the ALT-PE(M) in their classes. An instructional approach to supervision was used by the supervisor, who was also the observer, to try to bring about change in ALT-PE(M) by helping the student teacher organize his classes more efficiently. It was hoped that the organization changes would allow more student opportunity to use and practice the skills of volleyball during game play. Since both classes were involved in game play in the volleyball unit, the student teacher was asked to define an area of concern during the game play section of the unit. Both student teachers felt that during game play students in classs should be given more opportunity to use the skills they practiced during the drill section of the unit. Student teachers were then given feedback by the supervisor, indicating that students were more involved in waiting during the game as a substitute or waiting for the ball to be put into play than actually playing the game and performing the skills of volleyball. The problem for both student teachers was that they understood the problem, but did not know how to ameliorate it. The intervention was very simple. For example, in the class

with thirty-two pupils, students were usually put on one of two teams. Each team played with nine on a side with seven substitutes for each team. Since the class had only one-half of the gym, only one court could be set up. The change made by the student teacher, with the supervisor's guidance was to set up another court on the balcony and have four teams with six on a side playing at one time. This left all four teams with just two substitutes. The supervisor than asked the student teacher, what else can the substitutes do other than just watch the game? The student teacher, with the supervisor's help, decided to have the two substitutes work on skills at the end of the gym by themselves or with a partner(s), on bumping, serving, setting, etc. Task cards were put up by the student teacher each day. Students, when substitutes, had to work on skills during part of the time they were waiting to re-enter the game. After the two drills they could help keep track of how team/individuals were doing in the day's goals set up by the teacher in such areas as, percent of successful serves by a team, successful percent of individual bump opportunities, etc. Also during this time the substitutes could get a water break, rest, and listen to feedback by the instructor on skills, strategy, rules, etc.

After the initital implementation of this intervention, feedback was given to the student teacher by the supervisor on the last class's percentage of students not engaged waiting, not engaged interim, and off task during physical education content. (e.g. for the last class, students were not engaged twenty-five percent of the time during physical education content.)

Experimental Design

A multiple baseline (Hall 1971) across two subjects was used as the experimental design for this study. Multiple baselines have gained in popularity since their inception into educational based studies. In the study completed targeted students from each student teacher's class were measured at the same time during baseline, before any intervention strategy was employed. Following

baseline, the intervention strategy was implemented on only the first class in the study. During intervention on the first class, baseline and measurement continued on the other class. After a behavior change was generated on the first class, the same intervention was applied to the second class.

Causality is demonstrated when a behavior change has occurred in the first subject, and the intervention creates a change in the second subject, following intervention on it. A major advantage in using a multiple baseline is that it repeatedly analyzes the treatment (independent variable) rather than the dependent variable as in a reversal design.

The third tier of the multiple baseline in this study was used as a concurrent baseline for a different target behavior which was the number of inappropriate behaviors by the class during physical education. Inappropriate behaviors was defined as fighting, horsing around, leaving the gym without permission, making fun of others, and bothering other classes. An average of inappropriate behaviors was kept on the two classes during each session, but no interventions were employed.

Results

The percentages of ALT-PE(M) increased in both subjects targeted students and classes over baseline. Subject one's targeted students had an average of seven point five percent ALT-PE(M) during baseline and a mean average of twenty percent during intervention, an increase of twelve point five percent. Student teacher two's targeted students also had a mean average of seven point five percent ALT-PE(M) during baseline, and a mean average of eighteen percent during intervention, an increase of ten point five percent. Table 3 illustrates the change in both ALT-PE(M) and engaged motor intervals during intervention.

Table 3 goes about here

Both subjects averaged one point nine minutes of ALT-PE(M) during baseline, and both subjects's targeted students demonstrated an increase over baseline. Class

one increased to an average of five minutes during intervention and class two to four and a half minutes. This was an average increase of over three minutes for class one's targeted students and over two and a half minutes for class two's targeted students in ALT-PE(M) over baseline. Table 4 represents the changes in time spent in ALT-PE(M) from baseline, for both subjects' targeted students.

Table 4 goes about here

Figure 1 graphically demonstrates the daily percentages of ALT-PE(M) in both student teachers' targeted students during baseline, intervention, and during the post check phase of the study. Also demonstrated in figure 1 (third tier of the multiple baseline) was the number of inappropriate behaviors that occurred daily in each class from baseline through the post check phase of the study. No intervention was applied on this target behavior, although the daily number of inappropriate behaviors was almost eliminated by the end of intervention and post check phases.

Figure 1 goes about here

Two post checks were taken on percentages of ALT-PE(M) on the two subjects' targeted students. The post checks were taken after the intervention of supervisory feedback was removed. The first post check was taken one week after intervention, and the second post check was taken three weeks after intervention. Mean rates from the two post checks on each student teacher's targeted subjects only decreased slightly after intervention for both engaged motor and ALT-PE(M), but was still well above baseline levels. Table 5 illustrates percentages of engaged motor and ALT-PE(M) during baseline, intervention, and post check phases of this study.

Table 5 goes about here

There was an average of three and a half inappropriate behaviors per class during post check phase. This was well below the average thirteen at the beginning of the study, before intervention was applied on subject one.

Figure 2 illustrates the trends in the data during baseline and intervention for both subjects targeted students and for inappropriate behavior, which was not intervened on.

Figure 2 goes about here

Both student teachers' targeted subjects had stable trends in baseline and had ascending trends during intervention, which was in the direction desired. Inappropriate behavior in the concurrent baseline shows a decending trend as the intervention progressed.

Discussion

The results indicate that a behavior change did occur in both student teachers' targeted students as a result of the intervention which was supervisory feedback. The use of a multiple baseline across subjects allows a statement of causality to be made because the change of the dependent variable on both subjects was in the desired direction. This change was due to the intervention applied since the intervention was applied to different subjects at different times.

Although an increase in the mean percentage of ALT-PE(M) was demonstrated, it was decided to further analyze the data by using the line of best fit (Parsonson and Baer 1978). This analysis is much more stringent than just visual analysis of the multiple baseline. In examining Figure 2, both subjects had stable baselines and ascending trends during the intervention phase. This analysis allows a claim that a functional relationship had occurred. The concurrent baseline of inappropriate behavior in third tier of the multiple base-

line in figure 2 demonstrates a decending trend as the intervention was applied to the target behavior of ALT-PE(M) even though no direct intervention was applied to it. This leads the experimenter to come to a conclusion that the increasing of ALT-PE(M) has a direct effect on decreasing inappropriate behavior during class.

Post checks taken after intervention demonstrate that rates of both engaged motor and ALT-PE(M) went down on the average of one and a half percent over intervention level, but increased one hundred thirty three percent over base-line levels. A conclusion can be made that results were maintained for both student teachers' classes in the game section of the volleyball unit.

The importance of this study is that the use of ALT-PE(M) as a target behavior during student teaching can be improved with supervisory guidance. It also demonstrates that university supervisors can make a difference in helping student teachers improve their instructional performance and in helping the student teacher increase student achievement. The use of the ALT coding format is a valuable supervisory tool and should also be used by cooperating teachers. The reason it is suggested that cooperating teachers be trained to use the ALT-PE system is because university supervisors in reality cannot make visits to their student teachers everyday, therefore it would be a great advantage for cooperating teachers to be trained to use the system since they work with the student teachers each day. Under normal university supervisory conditions in which the supervisor makes one or two visits per week, not as much change would have occurred on the target behavior. Even though ALT-PE(M) was maintained after intervention in the game section of this unit by the student teacher, it would still tend to fluctuate in other units and other sections within the same unit. Still, both student teachers made progress in the area of prescription (selecting instructional strategies that help students reach goals set by the teacher) (Metzler 1982) and increasing practice opportunities for students during

activity time, rather than waiting for an opportunity during activity time. Another value of this study is that it adds another experimental study in ALT-PE and demonstrates that increasing ALT-PE can effect other behaviors such as the decrease of inappropriate behavior during class.

One recommendation for further study would be to begin to do studies on the increasing of ALT-PE(M) and the decreasing of non engaged time in other teacher preparation courses, such as methods classes. It would be very valuable for students at this stage to work on increasing ALT-PE(M), thus increasing individual time on task by decreasing the waiting that usually takes place in the normal physical education programs during drill and game conditions. It would be interesting to keep track of a student intern's progress in the increasing of ALT-PE(M) during peer teaching and field experience settings during methods class, and then to investigate and measure the carry over during the student teaching experience. Another interesting study would be to investigate the differences in student interns trained during methods class using ALT-PE with students who were not and then assessing the differences between the two sets of student teachers during the student teaching experience. ALT-PE and its coding system has some flaws, although many have been worked out recently (Siedentop et al. 1982). Even in its present form the ALT-PE observation system is the most useful tool we have to improve teacher effectiveness and student achievement in all levels of physical education.

TABLE 1

Scored Interval Reliability Percentages

for Four Major Categories and Total Intervals

	Observer 1	Observer 2
Setting	95.0	100
Content	94.0	95.0
Learner Move	88.0	85.0
Difficulty Level	90.0	89.0
TOTAL	93.0	93.5

TABLE 2

Mean Percentages During Baseline

for Major Coding Categories

	Class 1	Class 2
Content-PE	85.0	88.0
Engaged Motor	17.0	20.0
ALT-PE(M)	7.5	7.5

TABLE 3

Intervention Mean Percentages

for Engaged Motor and ALT-PE(M)

	Class 1	Class 2
Engaged Motor	42.0	44.0
ALT-PE(M)	20.0	18.0

TABLE 4

Baseline and Intervention Average

Amount of Time In Minutes Per Class in ALT-PE(M)

	Class 1	Class 2
Baseline	1.9	1.9
Intervention	5.0	4.5

TABLE 5

Baseline Through Post Check Mean Percentages

for Engaged Motor and ALT-PE(M)

	B	I	Post Check	Increase over Baseline
Class 1 Engaged Motor	17.0	42.0	38.0	147%
Class 2 Engaged Motor	20.0	44.0	41.0	120%
Class 1 ALT-PE(M)	7.5	20.0	18.0	167%
Class 2 ALT-PE(M)	7.5	18.0	17.0	140%

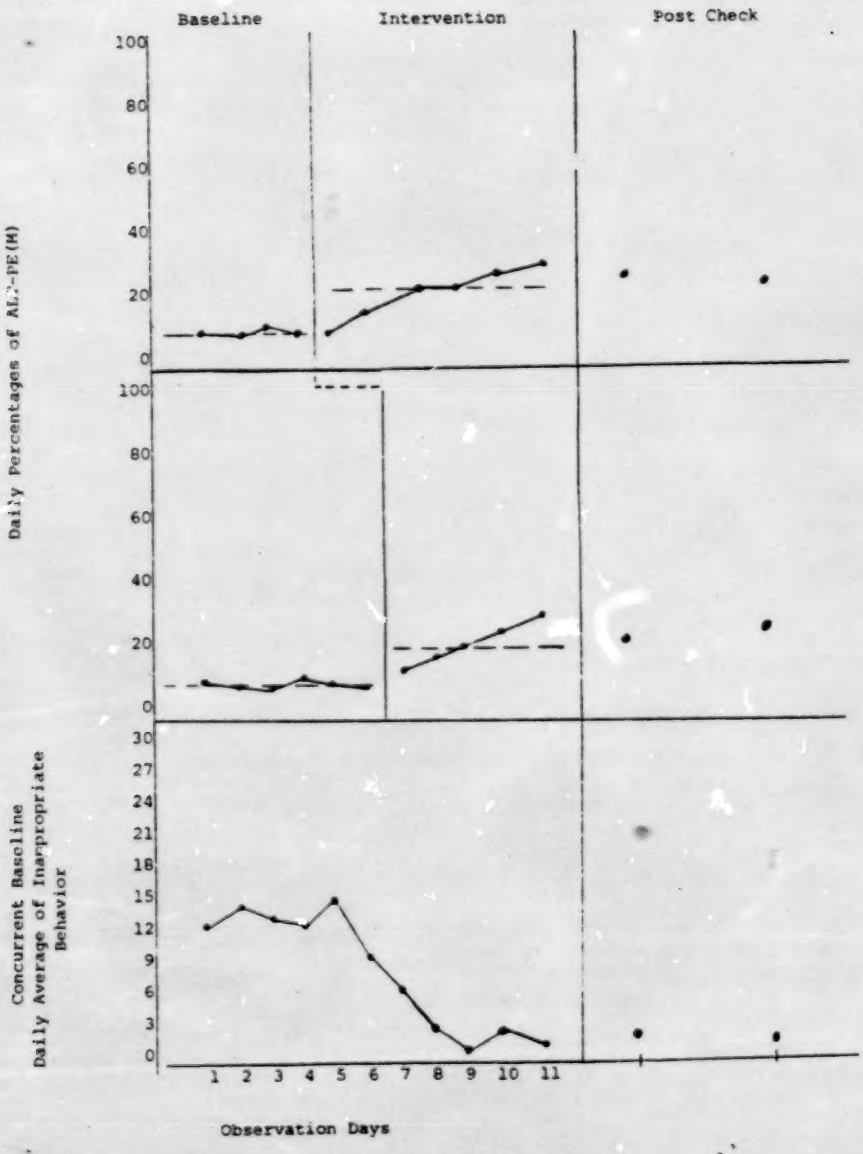

Figure 1. Daily percentages of ALT-PE(M) in two student teachers' targeted classes from baseline through intervention and post check phases. Also concurrent baseline on daily average of inappropriate behavior.

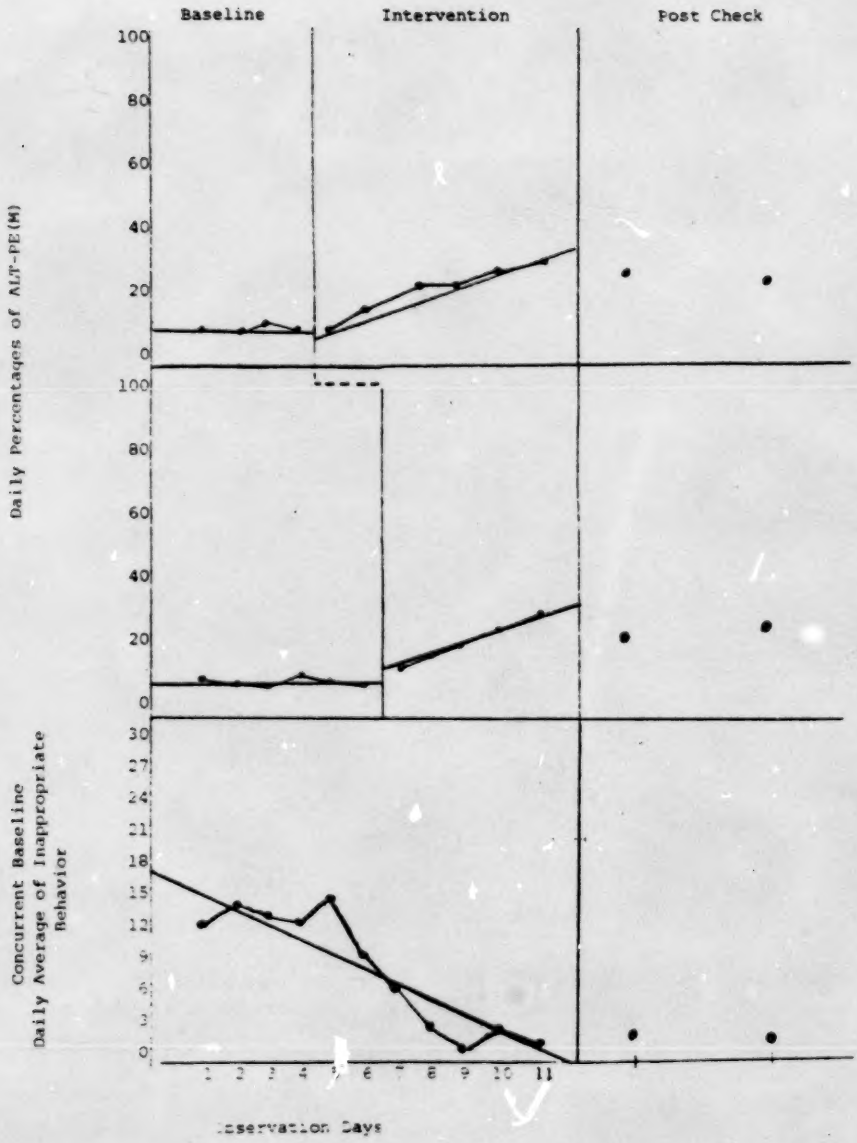

Figure 2. Line of best fit demonstrating the trends of the data in all phases of the study.

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